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conclusions and recommendations. A word may be said, however, on the conclusion that "continuation of government control . . . would have been helpful." If the Cuban 1919–20 crop had been purchased by a government agency such as the Sugar Board at $6\frac{1}{2}$ cents, ultimate return to normal market conditions would unquestionably have been delayed for another year and Cuban raw sugar would not now be selling at slightly over two cents per pound f.o.b. Cuba. At this late date it seems reasonably clear that it was just as well that we took our medicine in 1919 and now have the readjustment over with, once for all, although there was no necessity for much of the "economic friction" suffered in the process. What was required was not another period of government control but the early formulation of a definite government policy in 1919 as to the mechanism of the control. Under the conditions prevailing in 1919 the Executive was so overwhelmed with grave responsibilities that he could not give sufficient attention to the sugar situation. As for Congress, the slow process of national legislation with its hearings and "filibusters" could not meet the requirements of a business situation. Consequently the sugar trade was kept in a state of suspense for over six months. The experience with government control of sugar has thus given added proof that simplification and reorganization of the machinery of government must precede any increase in its sphere of activity.

There is warrant for justifiable criticism of the report for the inclusion of much material, especially among the exhibits, that is already available in other government documents. Thus, for example, the war-time contracts between sugar producers and the government agencies have already been printed in the annual reports of the Food Administration, in Senate and House Hearings on Sugar, in the sugar trade journals, etc. Such duplication of printing should be avoided wherever possible. A little of the $17,359.80* expanded for this inquiry might have been saved thereby.

JOSHUA BERNHARDT

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An Index of the Physical Volume of Production. By Edmund E. Day. Reprinted from the *Review of Economic Statistics*, September, 1920–January, 1921. Cambridge. 1921. Pp. 70.

Professor Day finds that "economic events of recent years have emphasized the need of an index of the physical volume of production." These events are the rise of prices since 1897, the lack of information as to "overproduction" or "underproduction," and the growth of an opinion that only an increase in physical units of goods and services indicates an improvement in economic condition. Consequently, on all accounts, a measure of the social product by units of volume is called for. "Almost no endeavor" has been thus far made to create such an index, and therefore Professor Day undertakes the task.

In attacking the problem before him Professor Day's first work is to pass in review the material available for use. He sketches data relating to the output

* As reported in the House Hearings on the Sunday Civil Appropriation Bill, 1922. Government Printing Office, 1921. P. 512.

of the twelve most important crops of the country, basing his figures on census and the Department of Agriculture statistics; adds mining figures including gold, silver, coal, copper, lead, zinc, petroleum, coke, etc., basing his figures on the Geological Survey, Bureau of the Mint, and Iron and Steel Institute statistics; and closes with manufactures under which he includes fourteen groupings, depending largely on the census for his information.

After presenting his agricultural figures the author prepares an "unadjusted index." To do this he calculates the average of the items of each series for the five years 1909–13 (the base period). Next, he expresses the items of the several series as percentages of the respective base period averages. A system of weights in accord with values is then introduced. A geometric mean of the twelve percentage relatives is then computed. The result is the unadjusted index for agriculture. An adjusted index is derived from the unadjusted by first determining the lines of secular trend and expressing every item of each crop series as a percentage of the corresponding ordinate of the line of the series' secular trend. Finally, there is computed for each year a weighted arithmetic mean of the twelve percentage relatives of the year, the same weights being employed as for the unadjusted index.

In mining an unadjusted index is computed along lines similar to those employed in agriculture. "Adjustment" is then effected by making due allowance for increases or decreases in production which may properly be considered normal. The methods are like those already outlined for agriculture.

The process of deriving the unadjusted index for manufactures is somewhat more complex than in the other two branches of production—agriculture and mining. Comparisons are made for intercensal years with other data drawn from independent sources. In the main the methods do not differ substantially from those used in the earlier sections of the study.

In preparing the adjusted index for manufactures the first step is the determination of the lines of trend for the thirty-three original series chosen. Percentage relatives resulting from the reduction of the items of the original series to percentages of normal are then computed. Finally, the adjusted index is secured by steps exactly paralleling those taken in the computation of the unadjusted index.

With the three main indices in hand, Professor Day confronts the question of combining them into a single figure. To this end there is computed an unadjusted form of index by calculating a weighted geometric mean for each year of the twenty-one year period under study. The weights used correspond to the aggregate values of production in agriculture, mining, and manufacture during the census year 1909. The adjusted index is a weighted arithmetic mean of the three separate indices. Comparison is then instituted with some familiar business indices, and coefficients of correlation are worked out. This brings the study to a close.

Professor Day is entitled to full credit for a careful and systematic piece of work in a field that has not heretofore been much attended to. The objections to any such undertaking, developed on any basis, and its faults as a means of gauging productive activities or economic welfare, are already obvious theoret-

ically, and need no discussion. Certain serious questions of a practical nature are, however, properly raised. Are basic statistics sufficiently refined to justify or require methods as elaborate as those used in Professor Day's data? Is it not probable that the use of an ordinary weighted arithmetic index would produce results as satisfactory? Such consideration seems to transfer the emphasis in the study of production to the matter of obtaining original data instead of allowing too much effort to be spent in elaborate computations. Since production is not as yet upon anything like as exact a statistical basis as prices and foreign exchange, undue refinement is misleading. It is worth noting, too, that while annual figures on such subjects are of historical interest, the real use of such indices as those of Professor Day will appear only when a simple and practical monthly measure of production is obtained. In general, a question must always arise as to how far we can understand and use composite results when we have so little relative knowledge of the different parts of the field. Research into the condition of special industries is an essential supplement and may be considered the next field to be cultivated, rather than the general index field.

H. PARKER WILLIS

War Costs and Their Financing. By Ernest Ludlow Bogart. New York: D. Appleton and Company, 1921. Pp. xxiv, 510.

One of the most remarkable features of the World War was the ability of the various belligerents to endure the economic strain for so long a period. At the outbreak of the conflict it was generally predicted that it would be short because the expensiveness of modern warfare would soon lead to the economic exhaustion of the belligerents. But for four long years the struggle raged with constantly augmenting fury and mounting expenditure. Consequently to every belligerent the problem of finance—the raising of funds to meet the huge expenditures involved—presented itself as one of enormous magnitude.

In *War Costs and Their Financing,* Professor Bogart has calculated the expenditures of the principal nations engaged in the war and has described the manner in which these expenditures were provided for. His study of war financing necessarily involved consideration of paper money issues and bank credit in the various warring countries. Less directly related to the main discussion of the book are chapters dealing with the financing of Europe after the war, and with post-war problems of currency, debt, and taxation. In the final chapter an attempt is made to summarize all the costs of the war, indirect costs as well as the direct outlays of the belligerent nations. An introduction is contributed by R. C. Leffingwell, former assistant secretary of the Treasury. In the appendices are contained various moratorium proclamations, liberty bond acts, and statistics of taxation and debt in the United States.

In this volume Professor Bogart gives only a summary statement of the expenditures of the belligerent countries. More detailed calculations are found in his study on *Direct and Indirect Costs of the Great World War,* from which most of the statistics in the present book are taken. His final figure for the total net